

Access DB# 223711

SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: JANIS DOTE Examiner #: 68274 Date: 5/1/07
Art Unit: 1756 Phone Number 302-1382 Serial Number: 10758, 869
Mail Box and Bldg/Room Location: REM 9C 75 Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: ORGANOPHOTO RECEPTOR WITH CHARGE TRANSPORT MATERIAL
HAVING TWO EPOXIDATED CARBAZOLYL GROUPS

Inventors (please provide full names):
① NUSRALLAH SUBRAN; ② ZBIGNIEW TOKARSKI; ③ VYTAUTAS GETAUTIS;
④ TADAS MAINAUSKAS; ⑤ EDMUNDAS MONTRIMAS; ⑥ JONAS VETUSIS;
Earliest Priority Filing Date: 1/16/04 SIDARAVICIUS

For Sequence Searches Only Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.

*Please search compounds in ^{attached} claims 26 and 30.
Note compound in claim 30 is a species
of compound in claim 26.*

SCIENTIFIC REFERENCE BR
Sci & Tech Inf. Cntr.

MAY 7 2007

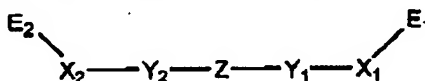
Pat. & T.M. Office

STAFF USE ONLY

Searcher: EL Type of Search Vendors and cost where applicable
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Searcher Location: _____ AA Sequence (#) _____ Dialog _____
Date Searcher Picked Up: _____ Structure (#) _____ Questel/Orbit _____
Date Completed: 5-11-07 Bibliographic _____ Dr. Link _____
Searcher Prep & Review Time: _____ Litigation _____ Lexis/Nexis _____
Clerical Prep Time: _____ Fulltext _____ Sequence Systems _____
Online Time: _____ Patent Family _____ WWW/Internet _____
Other _____ Other (specify) _____

Application No. 10/758,869

26. (Original) A charge transport material having the formula



where Y_1 and Y_2 comprise, each independently, a carbazolyl group;

X_1 and X_2 , each independently, have the formula $-(CH_2)_m-$, branched or linear, where m is an integer between 0 and 20, inclusive, and one or more of the methylene groups is optionally replaced by O, S, N, C, B, P, C=O, O=S=O, a heterocyclic group, an aromatic group, urethane, urea, an ester group, an amide group, an NR_3 group, a CR_4 , or a CR_5R_6 group where R_3 , R_4 , R_5 , and R_6 are, independently, a bond, H, hydroxyl, thiol, carboxyl, an amino group, an alkyl group, an alkenyl group, a heterocyclic group, an aromatic group, or part of a ring;

E_1 and E_2 comprise, each independently, an epoxy group; and

Z is a linking group comprising a bond, a $-(CR_5=CR_6)_n-$ group, a $-CR_7=N-$ group, or an aromatic group, where R_5 , R_6 , and R_7 are, each independently, H, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group, and n is an integer between 1 and 10, inclusive.

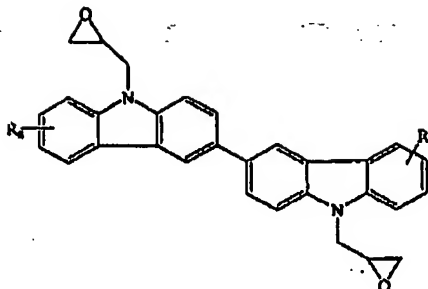
27. (Original) A charge transport material according to claim 26 wherein Z is a bond.

28. (Original) A charge transport material according to claim 26 wherein X_1 and X_2 are, each independently, a methylene group.

29. (Original) A charge transport material according to claim 26 wherein E_1 and E_2 are, each independently, an oxiranyl ring.

30. (Original) A charge transport material according to claim 26 wherein the charge transport material is selected from the group consisting of the following formula:

Application No. 10/758,869



where R₄ and R₅ are, each independently, H, hydroxyl, thiol, carboxyl, -CHO, a keto group, an amino group, cyano, nitro, a halogen, an alkoxyl group, an alkyl group, an alkenyl group, an epoxy group, a thiranyl group, an aziridino group, a heterocyclic group, or an aromatic group.

31. - 41. (Cancelled).

=> FILE REG

FILE 'REGISTRY' ENTERED AT 10:33:04 ON 11 MAY 2007
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=> D HIS

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L1 1 S E3
 L2 2 S 2.1839.22.20/RID
 L3 2 S 1<RID.CNT (T) 1839.22.20/RID
 E OXIRANE/CN
 L4 1 S E3
 L5 140 S 1<RID.CNT (T) 1.30.1/RID

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 L7 35289 S L5
 L8 12 S L6 AND L7

FILE 'CAOLD' ENTERED AT 10:32:14 ON 11 MAY 2007

L9 0 S L8

FILE 'ZCAPLUS' ENTERED AT 10:32:23 ON 11 MAY 2007

L10 7 S L8

=> FILE ZCAPLUS

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=> D L10 1-7 CBIB ABS HITSTR HITRN

L10 ANSWER 1 OF 7 ZCAPLUS COPYRIGHT 2007 ACS on STN
 2007:121403 Document No. 146:359433 Synthesis and cationic photocuring
 of new carbazole monomers. Lengvinaite, S.; Sangermano, M.;
 Malucelli, G.; Priola, A.; Grigalevicius, S.; Grazulevicius, J. V.;
 Getautis, V. (Dipartimento di Scienza dei Materiali e Ingegneria
 Chimica, Politecnico di Torino, Turin, I-10129, Italy). European

Polymer Journal, 43(2), 380-387 (English) 2007. CODEN: EUPJAG.
ISSN: 0014-3057. Publisher: Elsevier Ltd..

AB New carbazole monomers were synthesized and their cationic photopolymerization investigated. The monomers contain in each mol. two pendant carbazole groups and two functional groups reactive towards cationic photopolymerization. The investigated reactive groups were epoxy, oxetane or vinyl ether. Each type of monomer contains a spacer group namely ethylene oxide segment. The UV curing kinetics of the different monomers was monitored by real time FT-IR (RT-FTIR) analysis and the thermal properties evaluated by DSC.

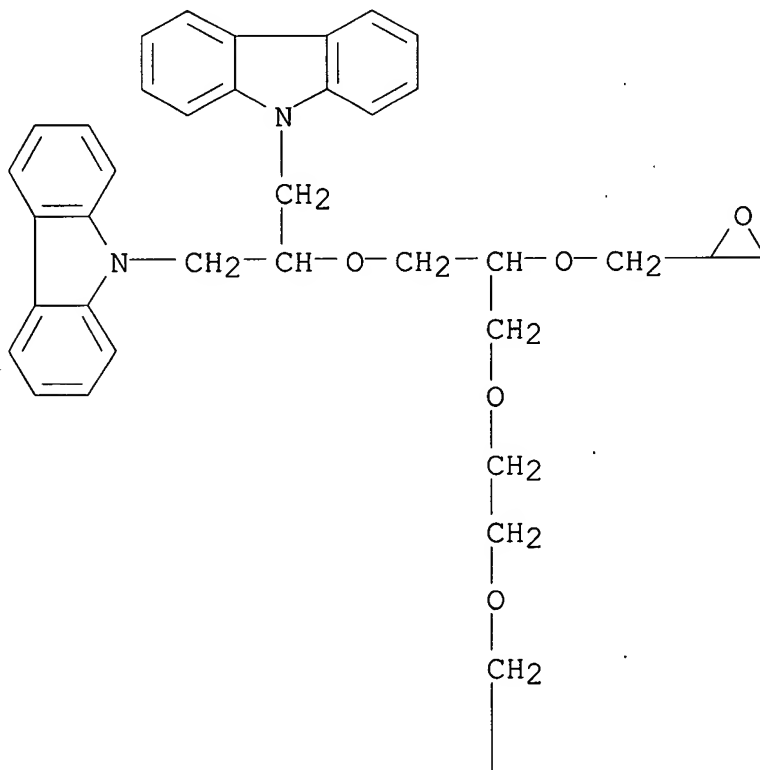
IT **930604-97-0P 930604-99-2P 930605-01-9P**

(monomer; synthesis and cationic photocuring of carbazole monomers)

RN 930604-97-0 ZCAPLUS

CN 9H-Carbazole, 9,9'-[2-[2-(2-oxiranylmethoxy)-3-[2-(2-oxiranylmethoxy)ethoxy]propoxy]-1,3'-propanediyl]bis- (CA INDEX NAME)

PAGE 1-A

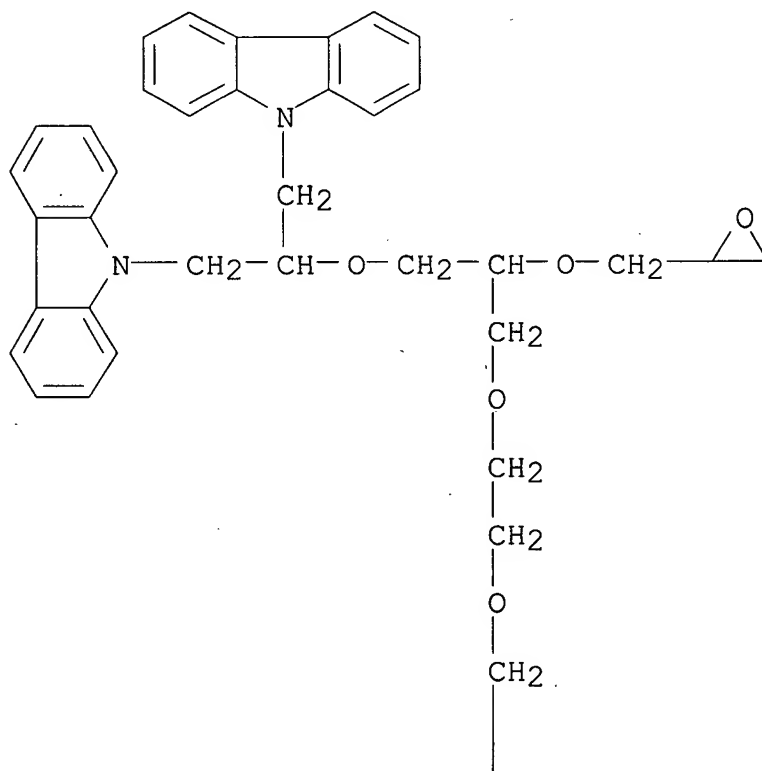


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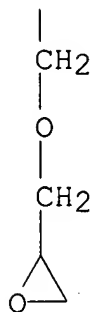


RN 930604-99-2 ZCAPLUS
CN 9H-Carbazole, 9,9'-[2-[2-(2-oxiranylmethoxy)-3-[2-[2-(2-oxiranylmethoxy)ethoxy]ethoxy]propoxy]-1,3-propanediyl]bis- (CA INDEX NAME)

PAGE 1-A

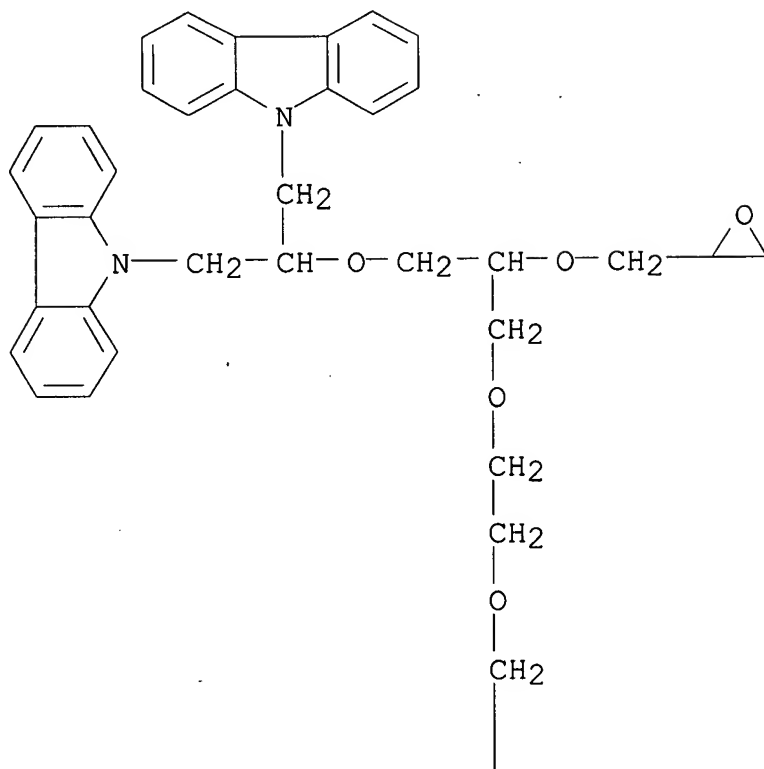


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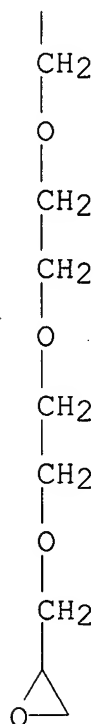


RN 930605-01-9 ZCAPLUS
CN INDEX NAME NOT YET ASSIGNED

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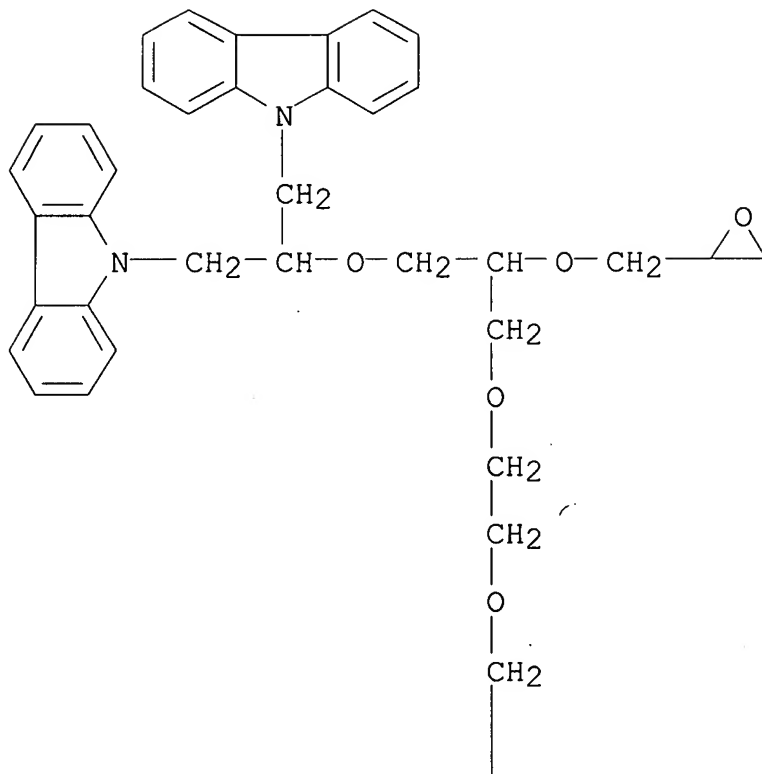


PAGE 2-A



IT **930605-11-1P 930605-13-3P 930605-15-5P**
 (synthesis and cationic photocuring of carbazole monomers)
 RN 930605-11-1 ZCAPLUS
 CN 9H-Carbazole, 9,9'-[2-[2-(2-oxiranylmethoxy)-3-[2-(2-oxiranylmethoxy)ethoxy]propoxy]-1,3-propanediyl]bis-, homopolymer
 (CA INDEX NAME)
 CM 1
 CRN 930604-97-0
 CMF C38 H40 N2 O6

PAGE 1-A



PAGE 2-A

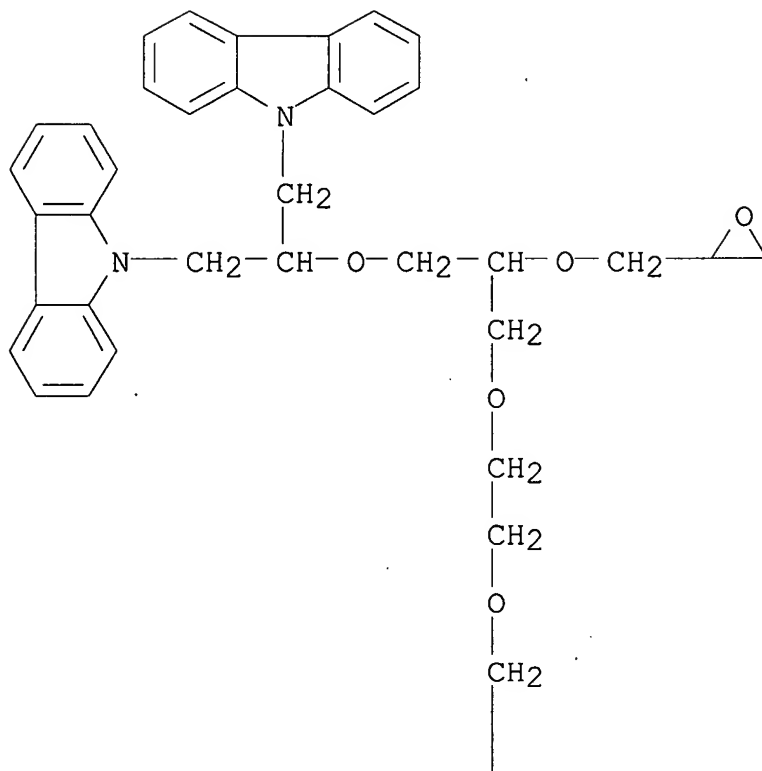


RN 930605-13-3 ZCAPLUS
 CN 9H-Carbazole, 9,9'-[2-[2-(2-oxiranylmethoxy)-3-[2-[2-(2-oxiranylmethoxy)ethoxy]ethoxy]propoxy]-1,3-propanediyl]bis-, homopolymer (CA INDEX NAME)

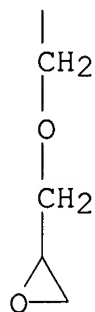
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PAGE 1-A



PAGE 2-A

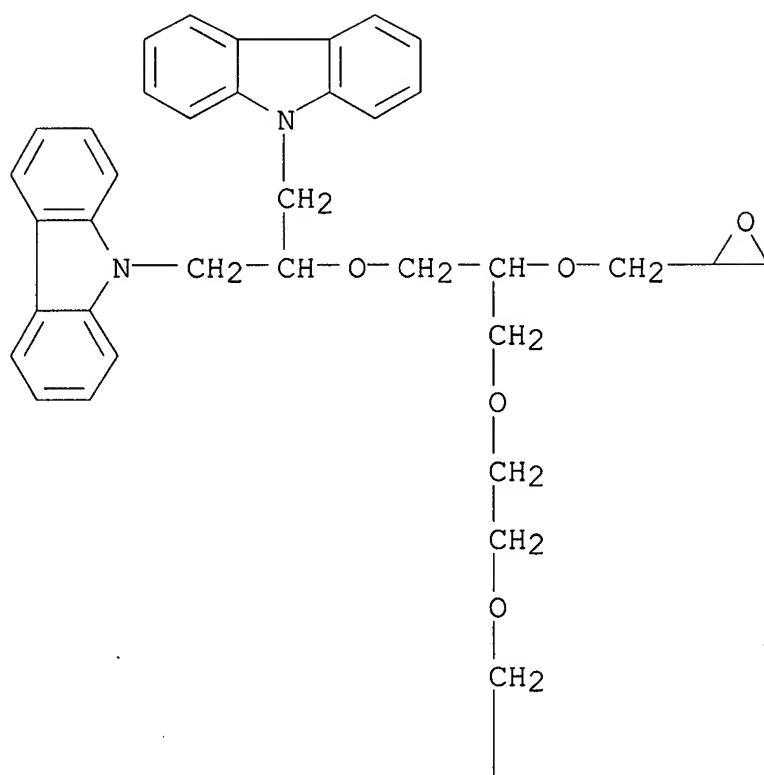


RN 930605-15-5 ZCAPLUS
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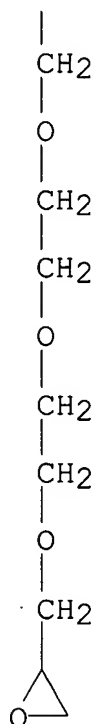
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CMF C44 H52 N2 O9

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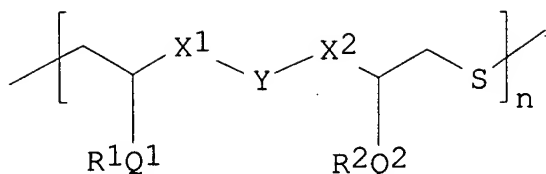
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- IT **930604-97-0P 930604-99-2P 930605-01-9P**
(monomer; synthesis and cationic photocuring of carbazole monomers)
- IT **930605-11-1P 930605-13-3P 930605-15-5P**
(synthesis and cationic photocuring of carbazole monomers)

L10 ANSWER 2 OF 7 ZCAPLUS COPYRIGHT 2007 ACS on STN
2006:13917 Document No. 144:117731 Polymeric charge transport materials having repeating units comprising an aromatic group and a -s- linkage. Jubran, Nusrallah; Tokarski, Zbigniew; Gaidelis, Valentas; Getautis, Vytautas; Malinauskas, Tadas; Montrimas, Edmundas; Law, Kam W. (USA). U.S. Pat. Appl. Publ. US 2006003241 A1 20060105, 29 pp. (English). CODEN: USXXCO. APPLICATION: US 2004-883453 20040701.

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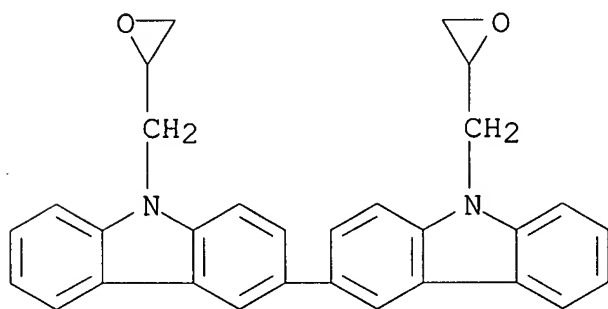
AB Improved organo photoreceptor comprises an elec. conductive substrate and a photoconductive element on the elec. conductive substrate, the photoconductive element comprising: (a) a polymeric charge transport material having the formula I ($n = 1-100,000$ with an av. value of greater than one; $Y = \text{arom. group}$; $X1$ and $X2 = \text{a bond or a linking group}$; $Q1$ and $Q2 = O, S, \text{ or } NR$; and $R, R1, \text{ and } R2 = H, \text{ alkyl group, alkenyl group, alkynyl group, acyl group, heterocyclic group, arom. group}$); and (b) a charge generating compd. Corresponding electrophotog. apparatuses, imaging methods, and methods of prepg. the polymeric charge transport material are described.

IT **857058-33-4P**

(prepn. of polymeric charge transport materials for electrophotog photoreceptors)

RN 857058-33-4 ZCAPLUS

CN 3,3'-Bi-9H-carbazole, 9,9'-bis(oxiranylmethyl)- (9CI) (CA INDEX NAME)



IT **872552-33-5P**

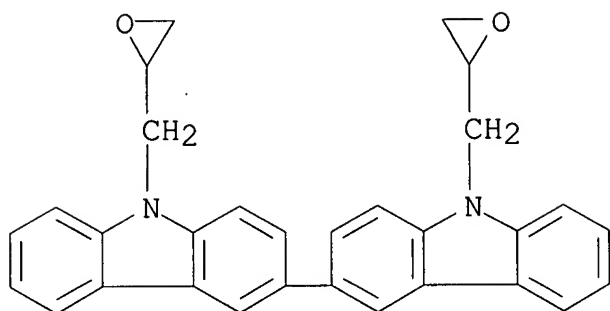
(prepn. of polymeric charge transport materials for electrophotog photoreceptors)

RN 872552-33-5 ZCAPLUS

CN Ethanethioamide, polymer with 9,9'-bis(oxiranylmethyl)-3,3'-bi-9H-carbazole (9CI) (CA INDEX NAME)

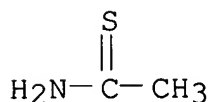
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CRN 857058-33-4
CMF C30 H24 N2 O2



CM 2

CRN 62-55-5
CMF C2 H5 N S



IT **857058-33-4P**

(prepn. of polymeric charge transport materials for electrophotog photoreceptors)

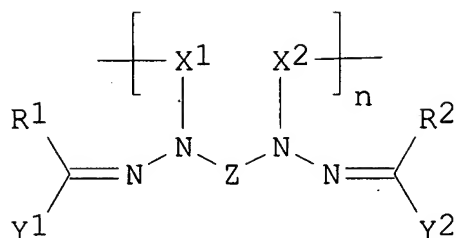
IT **872552-33-5P**

(prepn. of polymeric charge transport materials for electrophotog photoreceptors)

L10 ANSWER 3 OF 7 ZCAPLUS COPYRIGHT 2007 ACS on STN

2005:954089 Document No. 143:257010 Organophotoreceptor with charge transport compositions. Tokarski, Zbigniew; Montrimas, Edmundas; Grazulevicius, Juozas Vidas; Jubran, Nusrallah; Malinauskas, Tadas; Gaidelis, Valentas; Getautis, Vytautas (Samsung Electronics Co., Ltd., S. Korea). Eur. Pat. Appl. EP 1569040 A2 20050831, 36 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK, BA, HR, IS, YU. (English). CODEN: EPXXDW. APPLICATION: EP 2005-251084 20050224. PRIORITY: US 2004-789077 20040227.

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AB The present invention provides organo photoreceptors comprising an elec. conductive substrate and photoconductive element on the elec. conductive substrate, the photoconductive element having (a) a charge transport compn. with the formula I (Y1 and Y2 = arylamine group; X1 and X2 = linking group; R1 and R2 = hydrogen, alkyl group, alkenyl group, heterocyclic group, arom. group; Z is a bridging group; and n = integers between 1 and 100,000 with an av. value greater than 1); and (b) a charge generating compd. Corresponding electrophotog. apparatuses and imaging methods (processes) are described, as are charge transport compns.

IT **863396-32-1P 863396-34-3P**

(charge transport compns. for organo photoreceptor)

RN 863396-32-1 ZCAPLUS

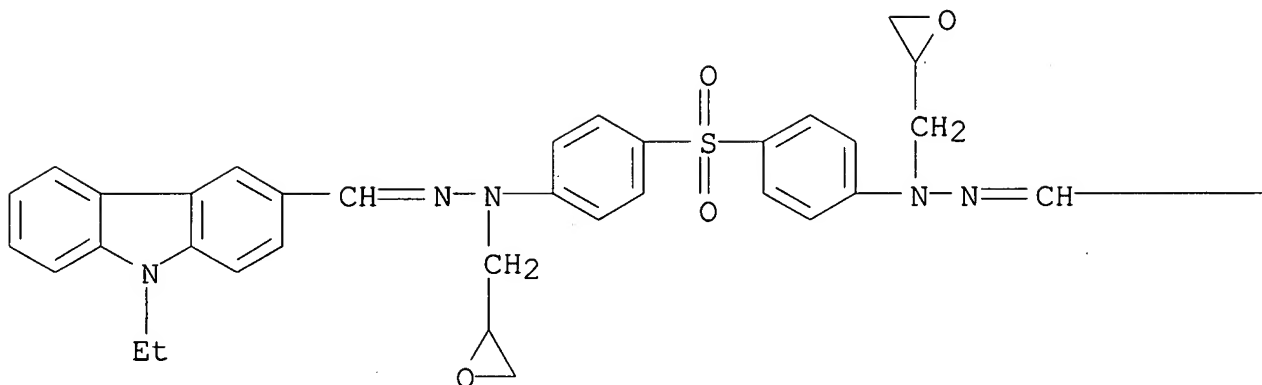
CN 9H-Carbazole-3-carboxaldehyde, 9-ethyl-, (sulfonyldi-4,1-phenylene)bis[(oxiranylmethyl)hydrazone], polymer with 4,4'-thiobis[benzenethiol] (9CI) (CA INDEX NAME)

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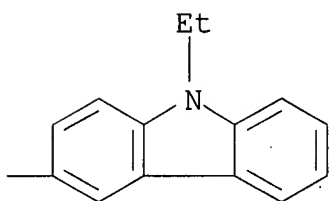
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CMF C48 H44 N6 O4 S

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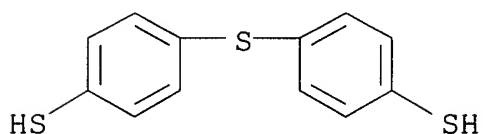
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CM 2

CRN 19362-77-7

CMF C12 H10 S3



RN 863396-34-3 ZCAPLUS

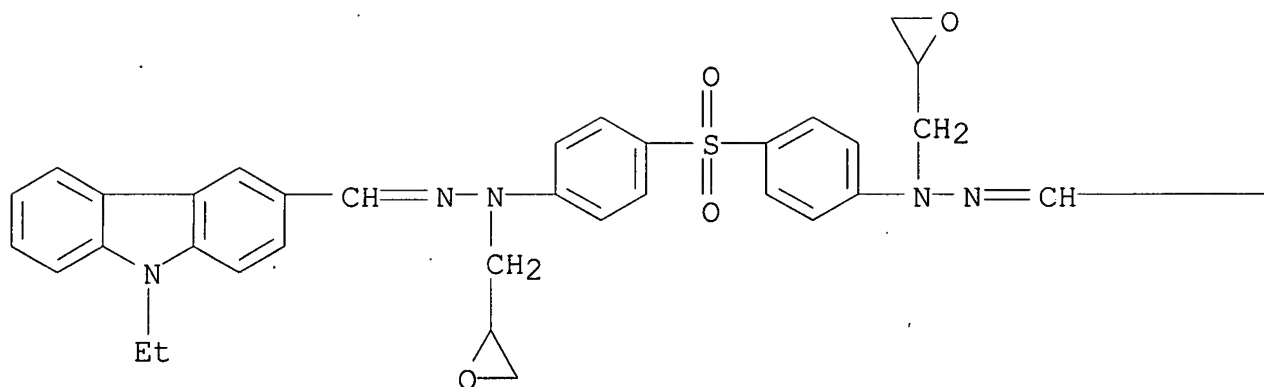
CN 9H-Carbazole-3-carboxaldehyde, 9-ethyl-, (sulfonyldi-4,1-phenylene)bis[(oxiranylmethyl)hydrazone], polymer with 1,3,4-thiadiazolidine-2,5-dithione (9CI) (CA INDEX NAME)

CM 1

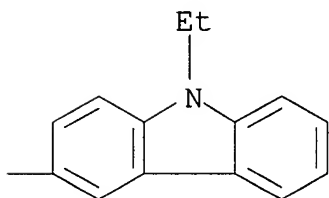
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CMF C48 H44 N6 O4 S

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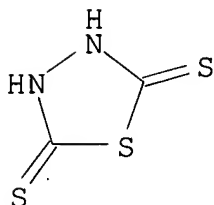
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CM 2

CRN 1072-71-5

CMF C2 H2 N2 S3



IT **863396-32-1P 863396-34-3P**
(charge transport compns. for organo photoreceptor)

L10 ANSWER 4 OF 7 ZCAPLUS COPYRIGHT 2007 ACS on STN

2005:922373 Document No. 145:17705 Novel hydrazone and azine based hole transport materials.- Tokarski, Zbig; Moudry, Ron; Jubran, Nusrallah; Getautis, Vytautas; Jankauskas, Vygintas; Daskeviciene, Maryte; Montrimas, Edmundas (Digital Printing Solutions Laboratory, Samsung Information Systems America, Woodbury, MN, USA). IS&T's NIP20: International Conference on Digital Printing Technologies, Final Program and Proceedings, Salt Lake City, UT, United States, Oct. 31-Nov. 5, 2004, 547-551. Society for Imaging Science and Technology: Springfield, Va. ISBN: 0-89208-253-4 (English) 2004. CODEN: 69HEBH. OTHER SOURCES: CASREACT 145:17705.

AB Thirteen novel hole transport materials were prep'd. in our labs either as polymeric structures (Compds. (1) - (7)) or as dimeric structures (Compds. (8)-(13)) and several were evaluated for electrophotog. These hole transport materials contain either hydrazone or azine moieties as part of the electrophotog. functional chromophore. The chem. structure of these compds. was confirmed by proton NMR, IR and UV spectroscopy. The ionization potential and hole mobility (det'd. via a xerog. time of flight method) are reported for some of these compds. The presence of hydroxyl groups on some of these materials improves adhesion and compatibility with traditional polycarbonate (PC) and polyvinylbutyral (PVB) binder materials. In addn., these dimeric or polymeric hole TM can be chem. cross-linked in the photo-conductive layer, for example, by reaction of the hydroxyl groups with polyisocyanates, to increase the layer stability to bending, stretching and abrasion, as well as the effects of abrasion. The synthesized TM and compns. with binder exhibit good hole transporting properties and high mobility making them useful for prep'n. of high sensitivity electro-photog. photoconductors.

IT **863396-32-1P 863396-34-3P**

(prep'n. of novel hydrazone and azine based hole transport materials)

RN 863396-32-1 ZCAPLUS

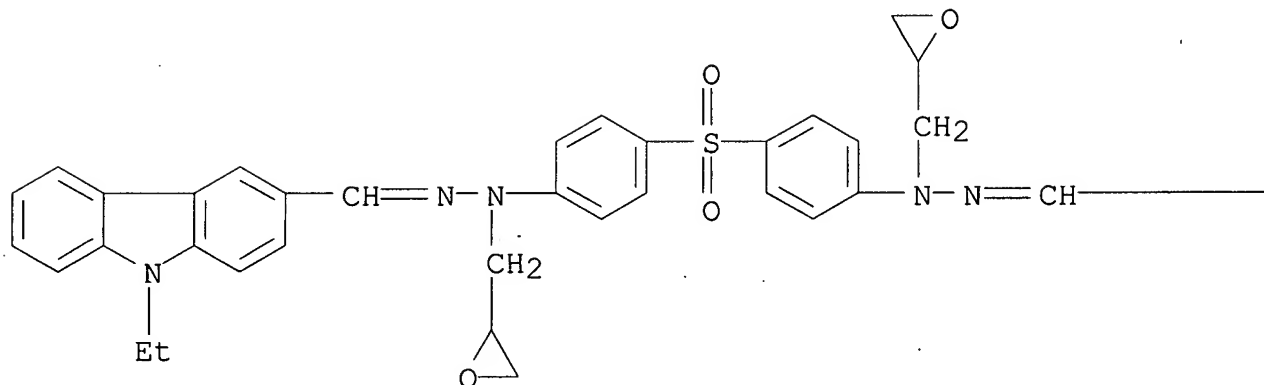
CN 9H-Carbazole-3-carboxaldehyde, 9-ethyl-, (sulfonyldi-4,1-phenylene)bis[(oxiranylmethyl)hydrazone], polymer with 4,4'-thiobis[benzenethiol] (9CI) (CA INDEX NAME)

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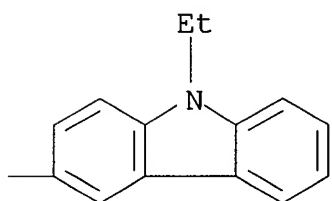
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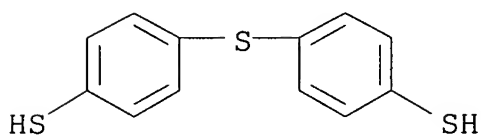


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CM 2

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CMF C12 H10 S3



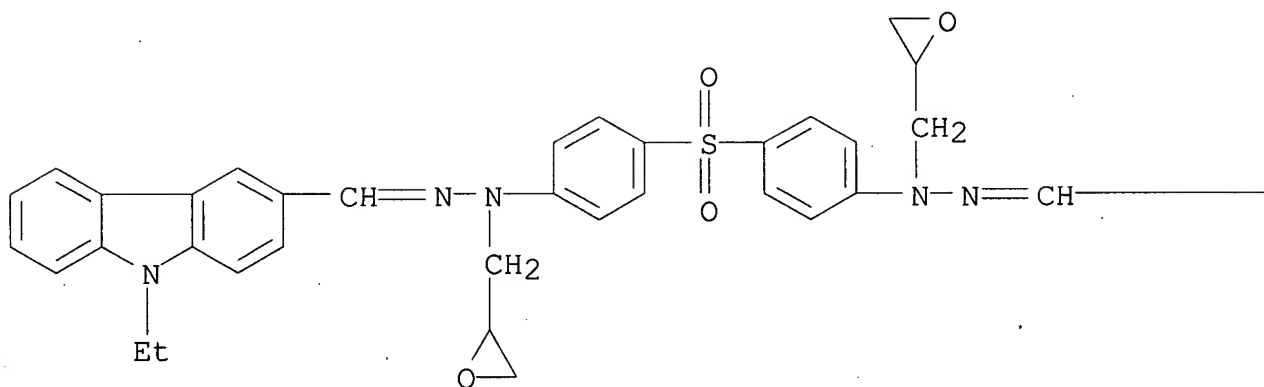
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CN 9H-Carbazole-3-carboxaldehyde, 9-ethyl-, (sulfonyldi-4,1-phenylene)bis[(oxiranylmethyl)hydrazone], polymer with 1,3,4-thiadiazolidine-2,5-dithione (9CI) (CA INDEX NAME)

CM 1

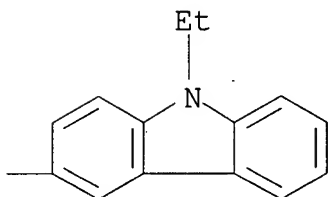
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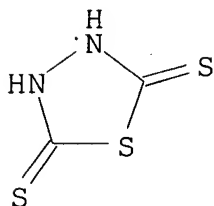
PAGE 1-B



CM 2

CRN 1072-71-5

CMF C2 H2 N2 S3



IT **863396-32-1P 863396-34-3P**
(prepn. of novel hydrazone and azine based hole transport materials)

L10 ANSWER 5 OF 7 ZCAPLUS COPYRIGHT 2007 ACS on STN

2005:632143 Document No. 143:142680 Organophotoreceptor with a charge transport material having two epoxidated-carbazolyl groups. Jubran, Nusrallah; Tokarski, Zbigniew; Montrimas, Edmundas; Sitaravicius, Jonas; Malinauskas, Tadas; Getautis, Vytautas (Samsung Electronics Co., Ltd., S. Korea). Eur. Pat. Appl. EP 1555577 (A2 20050720, 23 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK, BA, HR, IS, YU. (English). CODEN: EPXXDW. APPLICATION: EP 2005-250151 20050113. PRIORITY: US 2004-2004/758869 20040116.

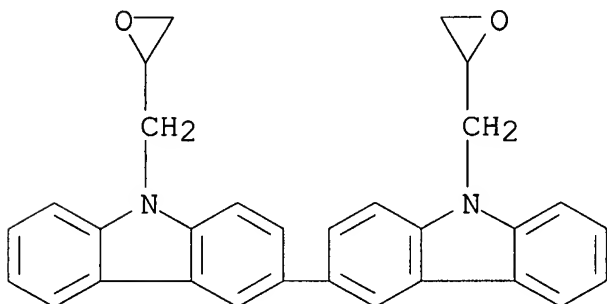
AB The present invention provides organo photoreceptors comprising an elec. conductive substrate and a photoconductive element on the elec. conductive substrate, the photoconductive element comprising: (a) a charge transport material E2X2Y2ZY1X1E1 (Y1, Y2 = carbazolyl group; X1,2 = bridging group; E1,2 = epoxy group; and Z = linking group); and (b) a charge generating compd. Organophotoreceptors with the charge transport material crosslinked to a polymeric binder are also described. Corresponding electrophotog. apparatuses and imaging methods (processes) are described, as are corresponding charge transport materials.

IT **857058-33-4P**

(charge transport material for organo photoreceptor)

RN 857058-33-4 ZCAPLUS

CN 3,3'-Bi-9H-carbazole, 9,9'-bis(oxiranylmethyl)- (9CI) (CA INDEX NAME)

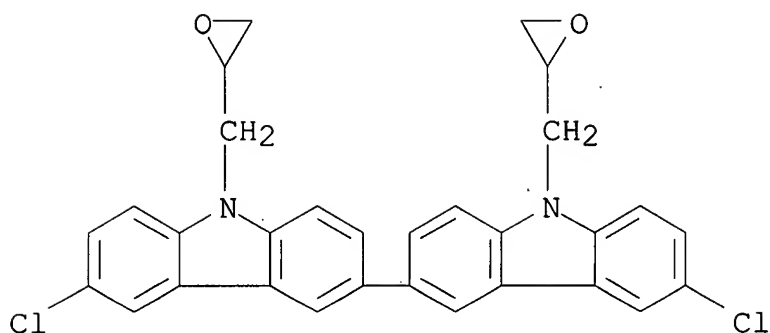


IT **858932-95-3P**

(charge transport material for organo photoreceptor)

RN 858932-95-3 ZCAPLUS

CN 3,3'-Bi-9H-carbazole, 6,6'-dichloro-9,9'-bis(oxiranylmethyl)- (9CI) (CA INDEX NAME)



IT **857058-33-4P**

(charge transport material for organo photoreceptor)

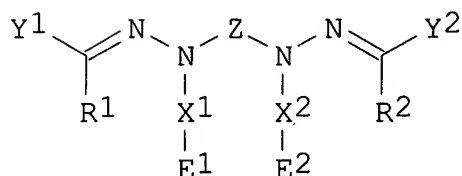
IT **858932-95-3P**

(charge transport material for organo photoreceptor)

L10 ANSWER 6 OF 7 ZCAPLUS COPYRIGHT 2007 ACS on STN

2005:582539 Document No. 143:106306 Organo photoreceptor with a charge transport material having two epoxide-hydrazone groups. Jubran, Nusrallah; Malinauskas, Tadas; Gaidelis, Valentas; Jankauskas, Vygintas; Tokarski, Zbigniew; Getautis, Vytautas (Samsung Electronics Co., Ltd., S. Korea). Eur. Pat. Appl. EP 1550914 A1 20050706, 25 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK, HR, IS, YU. (English). CODEN: EPXXDW. APPLICATION: EP 2004-257404 20041130. PRIORITY: US 2003-2003/749269 20031231.

GI



I

AB The present invention provides organo photoreceptors comprising an elec. conductive substrate and. a photoconductive element on the elec. conductive substrate, the photoconductive element comprising: (a) a charge transport material having the formula I (Y1 and Y2 = arylamine group; R1,2 = H, alkyl group, alkenyl group, heterocyclic group, arom. group; X1 and X2, = bridging groups; E1 and E2 = epoxy

group; and Z is a linking group comprising an alkyl group, an alkenyl group, a heterocyclic group, or an arom. group); and (b) a charge generating compd. The charge transport materials can be crosslinked to a polymeric binder, either directly or through a crosslinking agent. Corresponding electrophotog. apparatuses and imaging methods (processes) are described, as are corresponding charge transport materials.

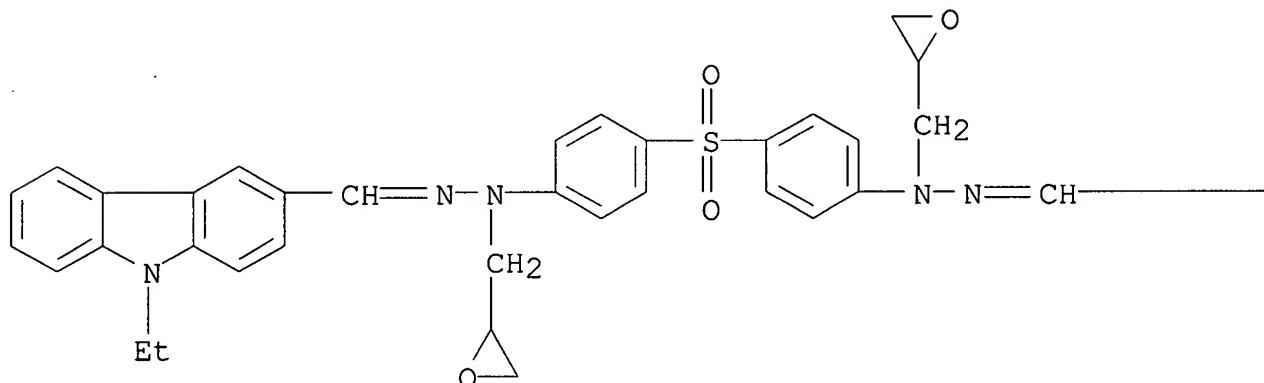
IT **857049-31-1P**

(charge transport material for organo photoreceptor)

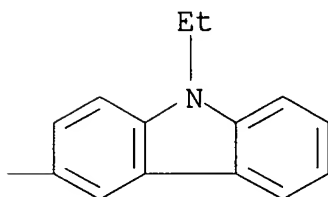
RN 857049-31-1 ZCAPLUS

CN 9H-Carbazole-3-carboxaldehyde, 9-ethyl-, (sulfonyldi-4,1-phenylene)bis[(oxiranylmethyl)hydrazone] (9CI) (CA INDEX NAME)

PAGE 1-A



PAGE 1-B



IT **857049-31-1P**

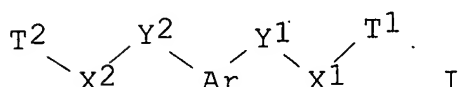
(charge transport material for organo photoreceptor)

L10 ANSWER 7 OF 7 ZCAPLUS COPYRIGHT 2007 ACS on STN

2005:582538 Document No. 143:106305 Organophotoreceptor with charge transport material having a thiiranyl group. Tokarski, Zbigniew; Montrimas, Edmundas; Jubran, Nusrallah; Paliulis, Osvaldas; Gaidelis, Valentas; Getautis, Vytautas (Samsung Electronics Co.,

Ltd., S. Korea). Eur. Pat. Appl. EP 1550913 A1 20050706, 33 pp.
 DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI,
 LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ,
 EE, HU, PL, SK, HR, IS, YU. (English). CODEN: EPXXDW.
 APPLICATION: EP 2004-257403 20041130. PRIORITY: US 2003-2003/749178
 20031230.)

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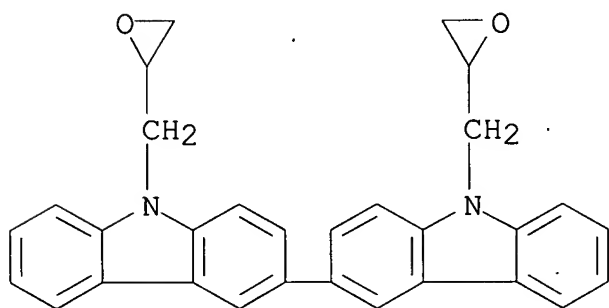
AB The present invention provides organo photoreceptors comprising a photoconductive element comprising: (a) a charge transport material having the formula I (Y1 and Y2 = a bond, -CR1=N-NR2-, or -CR3=N=N=CR4-; R1-4 = H, alkyl group, alkenyl group, heterocyclic group, arom. group; X1 and X2 = linking group; T1 and T2 = thiiranyl group, H, alkyl group, alkenyl group, arom. group with the proviso that at least one of T1 and T2 is a thiiranyl group; and Ar comprises an arom. group with the proviso that when both Y1 and Y2 are a bond and one of T1 and T2 is not a thiiranyl group, Ar comprises a bis[(N,N-disubstituted)amino]arom. group or a bicarbazole group); and (b) a charge generating compd. Corresponding electrophotog. apparatuses and imaging methods (processes) are described, as are corresponding charge transport materials.

IT **857058-33-4P**

(prepn. of charge transport material having thiiranyl group for organo photoreceptor)

RN 857058-33-4 ZCAPLUS

CN 3,3'-Bi-9H-carbazole, 9,9'-bis(oxiranylmethyl)- (9CI) (CA INDEX NAME)



IT **857058-33-4P**

(prepn. of charge transport material having thiiranyl group for
organo photoreceptor)